Given the abstract evolution equation

\[ y'(t) = Ay(t), \quad t \in \mathbb{R}, \]

with scalar type spectral operator \( A \) in a complex Banach space, found are conditions necessary and sufficient for all weak solutions of the equation, which a priori need not be strongly differentiable, to be strongly infinite differentiable or strongly Gevrey ultradifferentiable of order \( \beta \geq 1 \), in particular analytic or entire, on \( \mathbb{R} \). Also, revealed are certain interesting inherent smoothness improvement effects. The important case of the equation with a normal operator \( A \) in a complex Hilbert space is immediately obtained as a particular one. (Received September 20, 2018)